

1/59

FIG. 1
(RELATED ART)

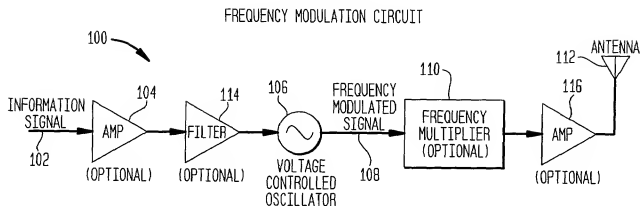


FIG. 2A
(RELATED ART)

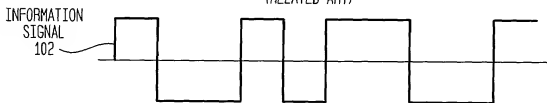
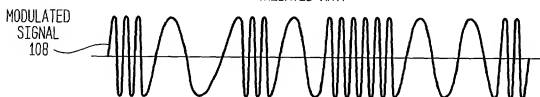


FIG. 2B
(RELATED ART)



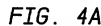
FIG. 2C
(RELATED ART)



2002/03/29/2968001

FIG. 3

PHASE MODULATION CIRCUIT



INFORMATION
SIGNAL
302

The diagram shows a square wave signal labeled "INFORMATION SIGNAL 302". The signal alternates between a high state and a low state across several time intervals.

FIG. 4B

OSCILLATOR SIGNAL
308

The diagram shows a periodic waveform on a horizontal baseline. The waveform consists of a series of sharp, narrow positive-going spikes followed by broader, shallower negative-going pulses. There are approximately 10 full cycles of this waveform shown across the frame.

FIG. 4C

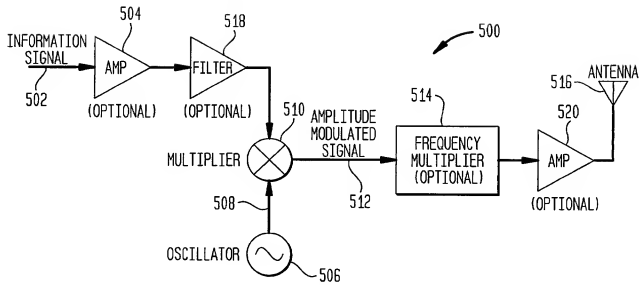
PHASE MODULATED SIGNAL 312

(RELATED ART)

3/59

FIG. 5
 (RELATED ART)

AMPLITUDE MODULATION CIRCUIT



2002/03/26 10:07:33

4/59

FIG. 6A
(RELATED ART)

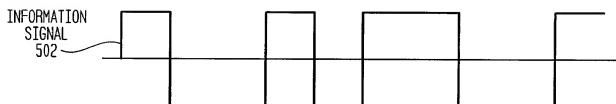


FIG. 6B
(RELATED ART)

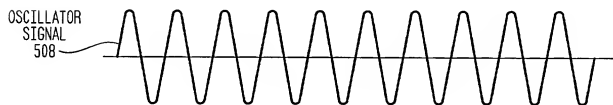


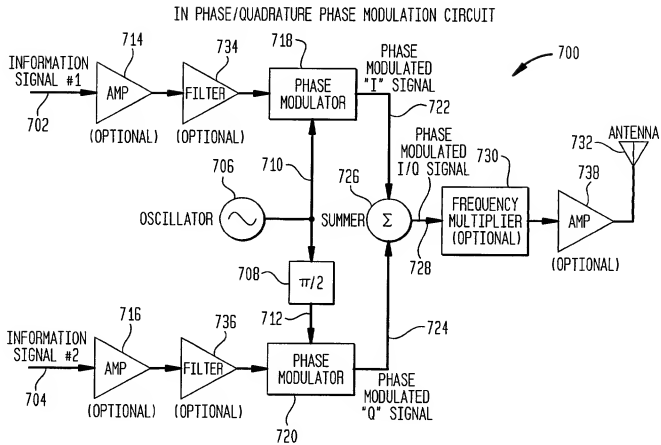
FIG. 6C
(RELATED ART)



2002/07/18/001

5/59

FIG. 7
 (RELATED ART)



200407260007

6/59

FIG. 8A
(RLATED ART)

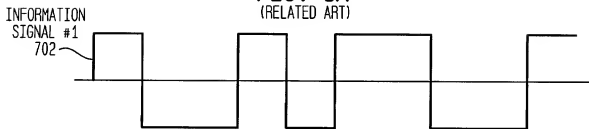


FIG. 8B
(RLATED ART)

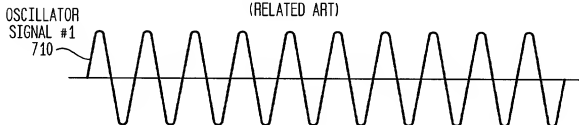


FIG. 8C
(RLATED ART)

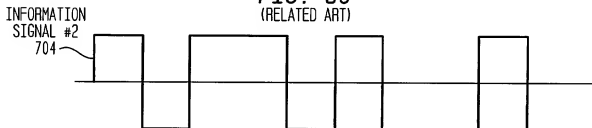


FIG. 8D
(RLATED ART)

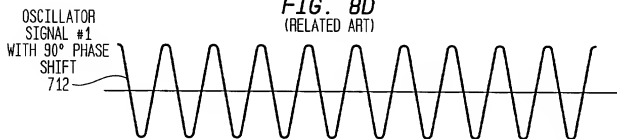
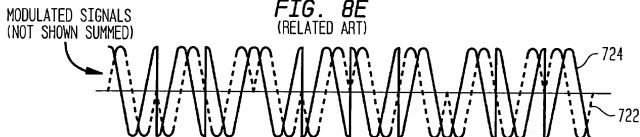


FIG. 8E
(RLATED ART)



2006367-071802

7/59

FIG. 9

TRANSMITTER

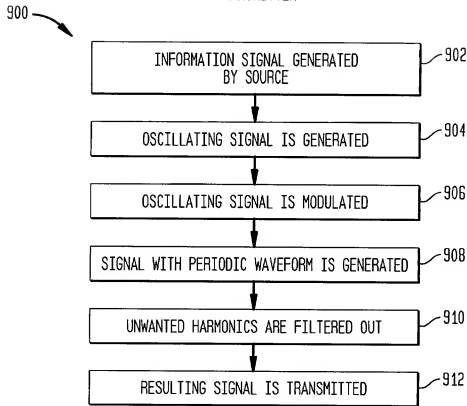
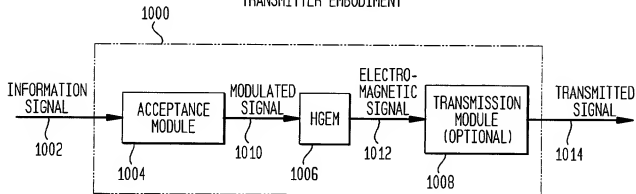


FIG. 10

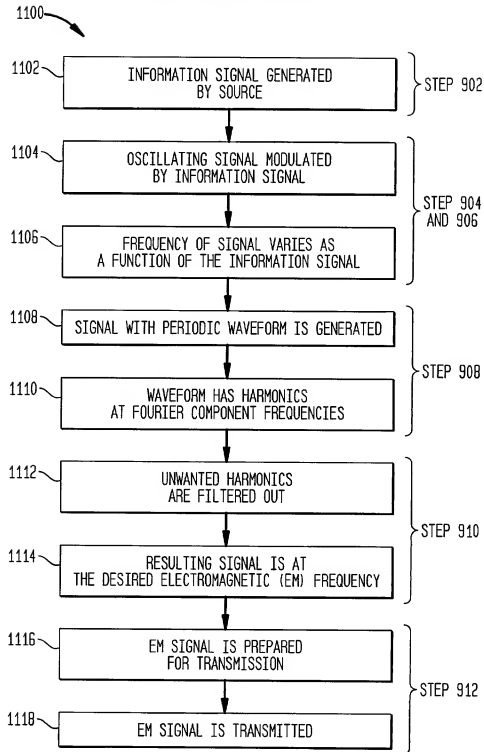
TRANSMITTER EMBODIMENT



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8/59

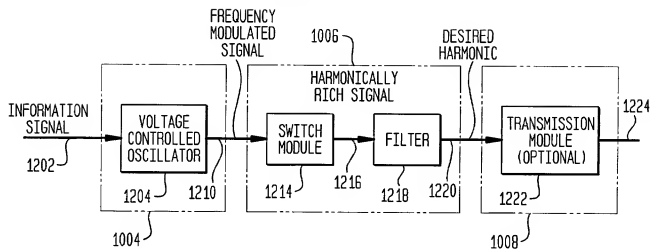
FIG. 11
FREQUENCY MODULATION MODE



2002/07/26/2002

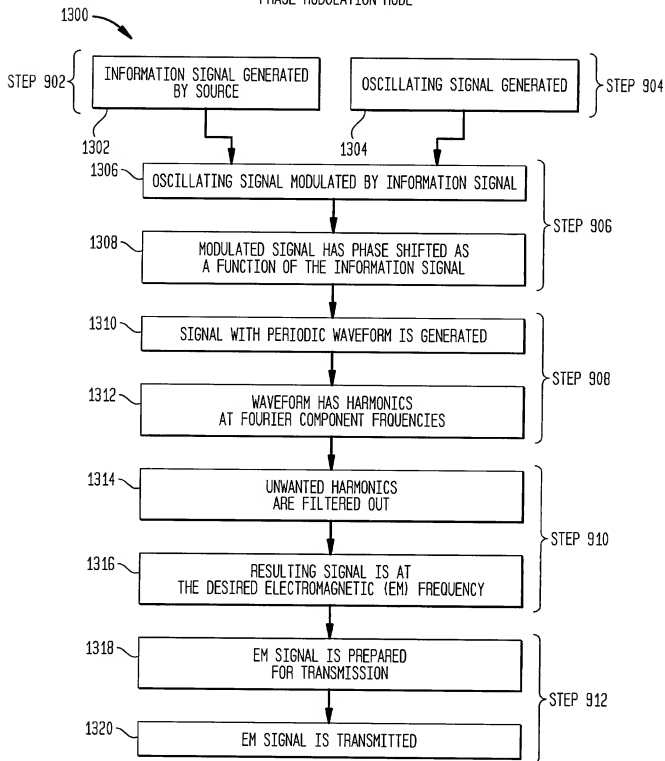
9/59

FIG. 12



10/59

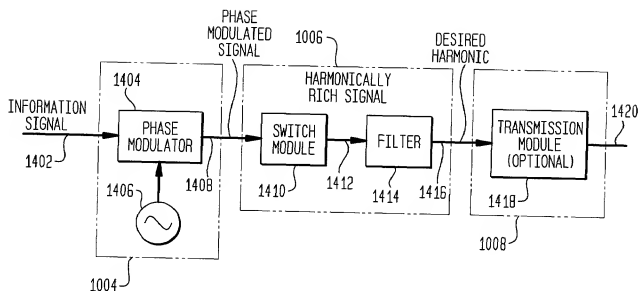
FIG. 13
PHASE MODULATION MODE



2001207929001

11/59

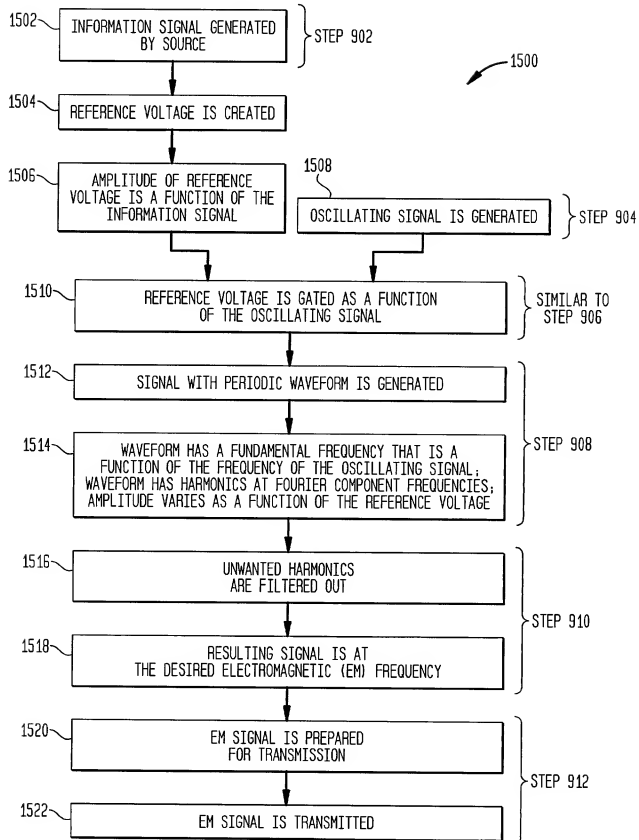
FIG. 14



12/59

FIG. 15

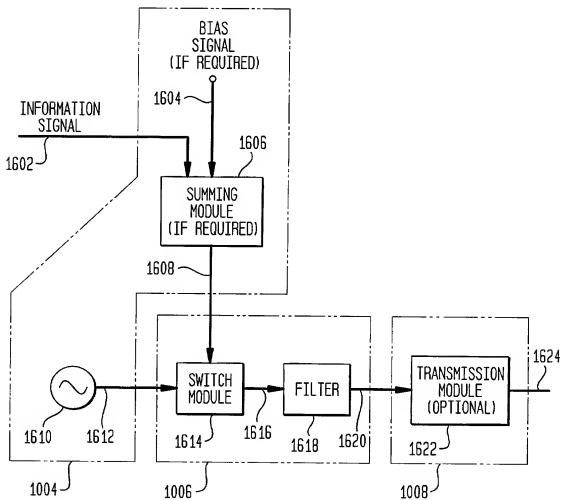
AMPLITUDE MODULATION MODE



20020307-074000

13/59

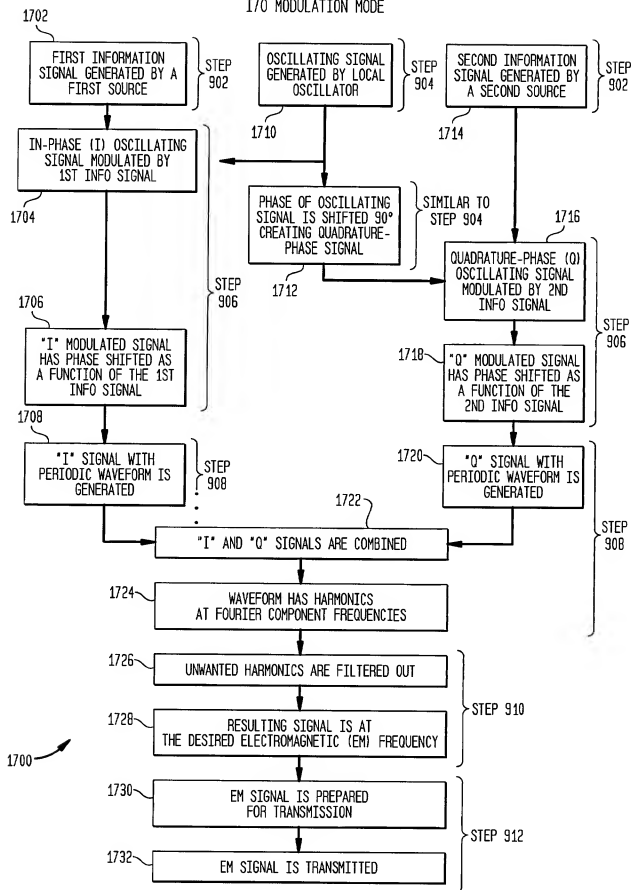
FIG. 16



14/59

FIG. 17

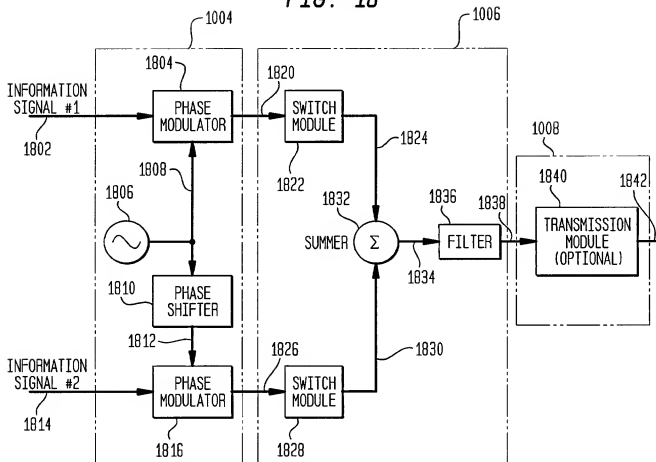
I/O MODULATION MODE



10086367-071802

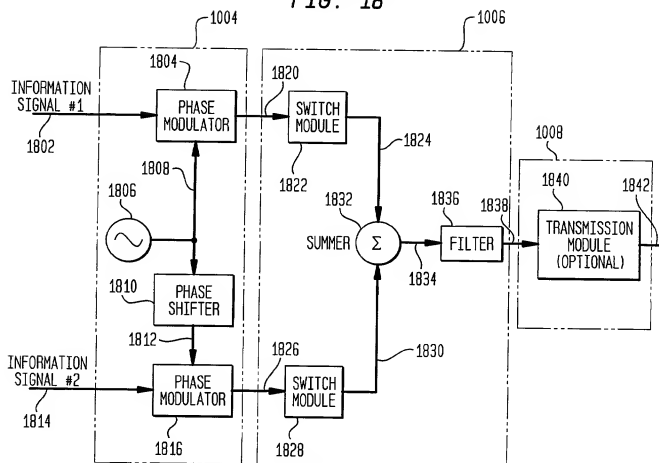
15/59

FIG. 18



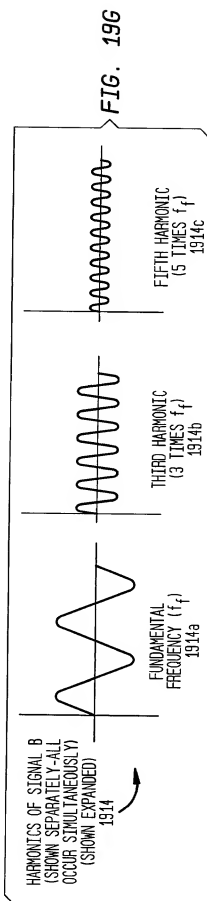
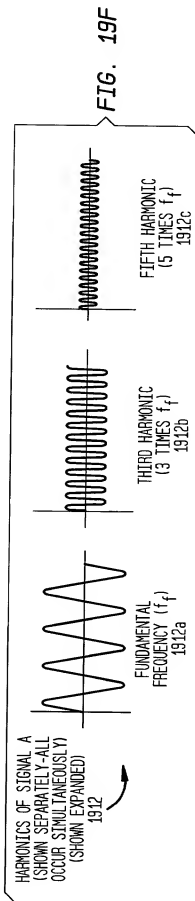
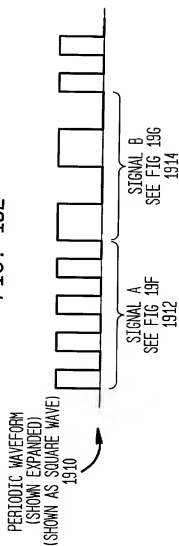
15/59

FIG. 18



20060307073601

FIG. 19E



18/59

FIG. 19H

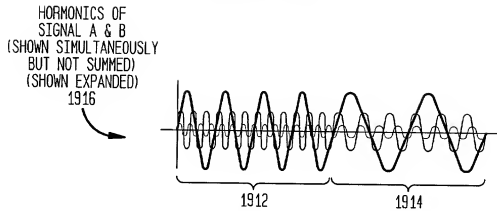
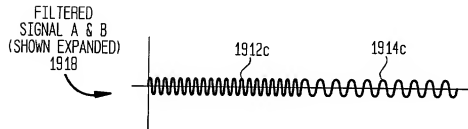


FIG. 19I



2008071802 10086267

19/59

FIG. 20A
(RELATED ART)

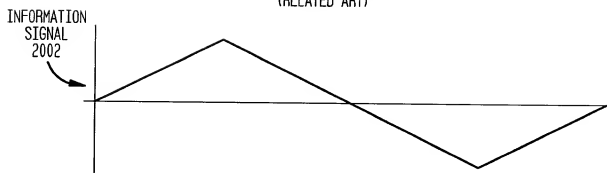


FIG. 20B
(RELATED ART)

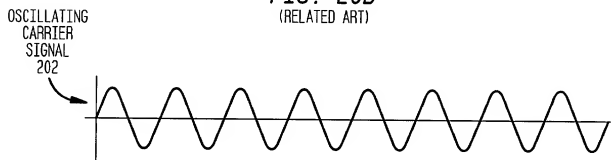
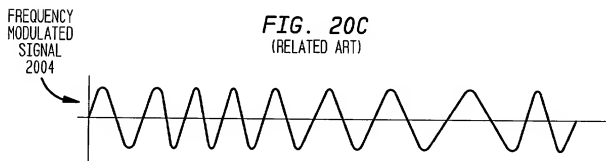


FIG. 20C
(RELATED ART)



2002070926801

20/59

FIG. 21A
(RELATED ART)

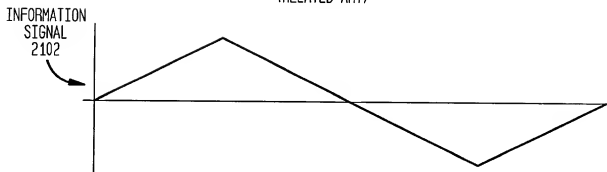


FIG. 21B
(RELATED ART)

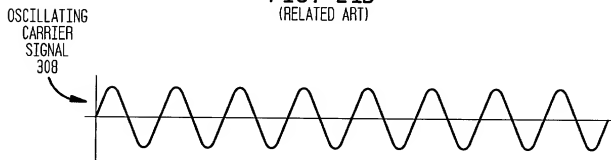
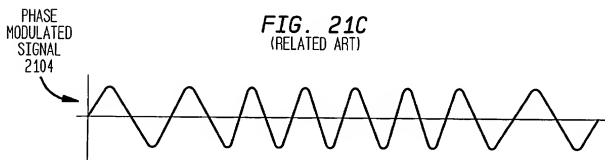


FIG. 21C
(RELATED ART)



2007-07-25 09:56:57

21/59

FIG. 22A
 (RELATED ART)

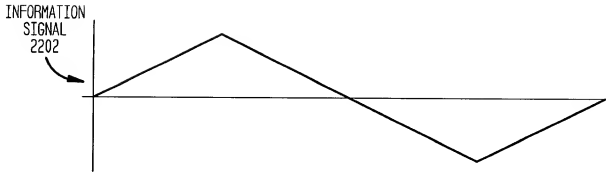


FIG. 22B
 (RELATED ART)

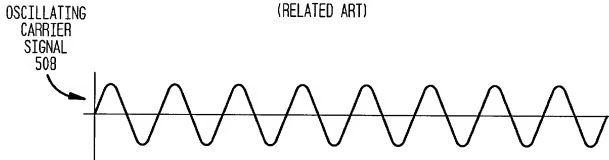


FIG. 22C
 (RELATED ART)

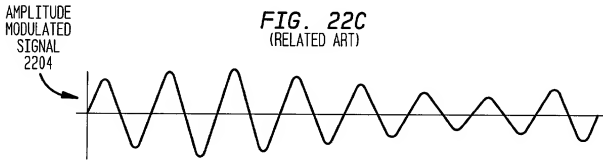
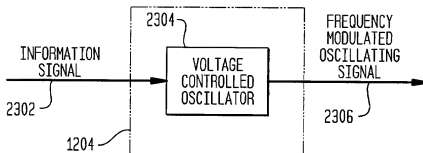


FIG. 23



2001/07/25/0001

22/59

FIG. 24

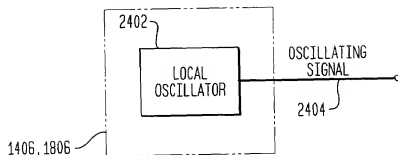


FIG. 25

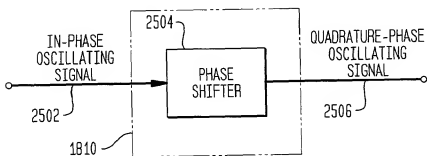


FIG. 26

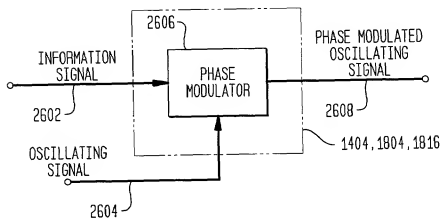
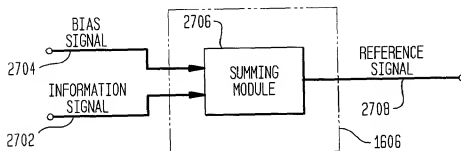


FIG. 27



2022/11/14 10:05:37

23/59

FIG. 28A

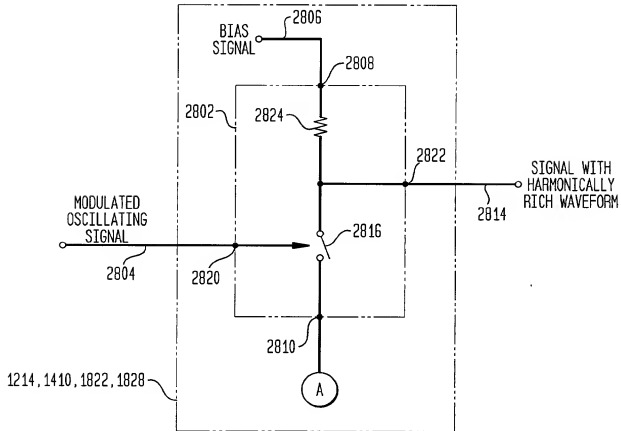
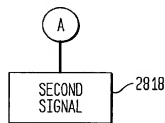


FIG. 28B



FIG. 28C



24/59

FIG. 29A

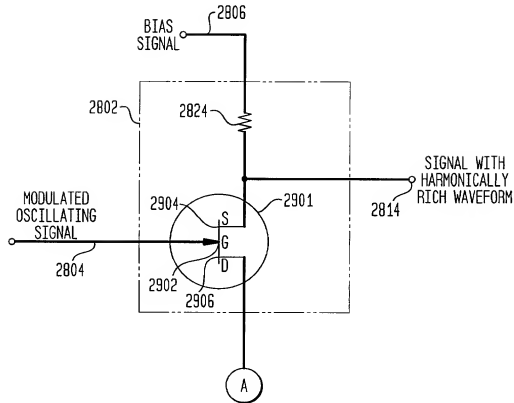
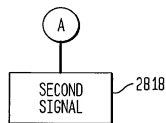


FIG. 29B



FIG. 29C



25/59

FIG. 30A

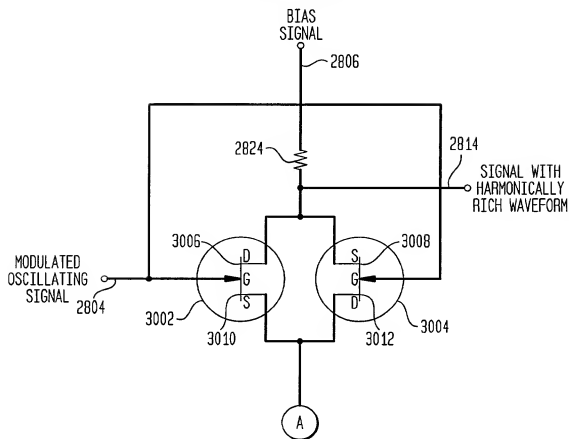
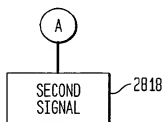


FIG. 30B



FIG. 30C



26/59

FIG. 31A

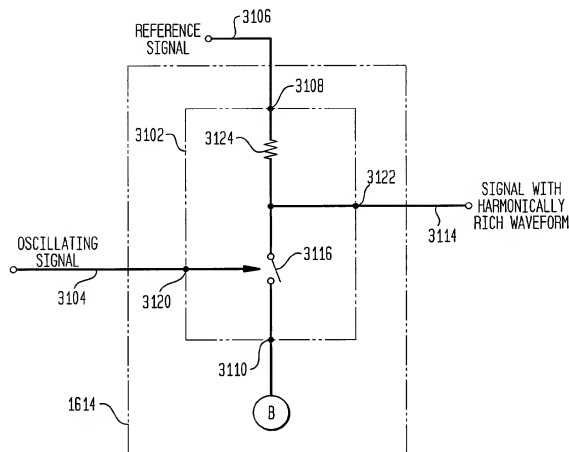
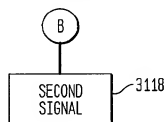


FIG. 31B



FIG. 31C



27/59

FIG. 32A

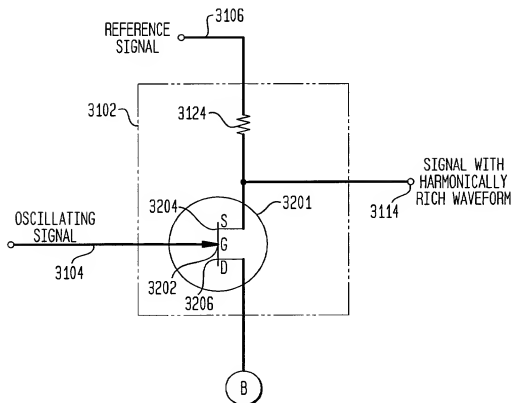
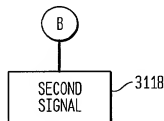


FIG. 32B



FIG. 32C



28/59

FIG. 33A

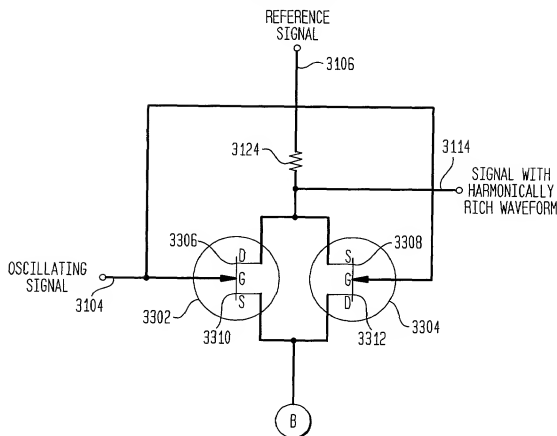
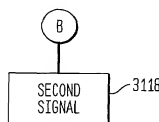


FIG. 33B



FIG. 33C



29/59

FIG. 34

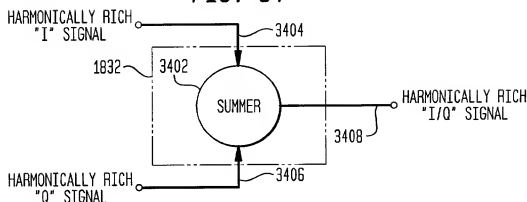


FIG. 35

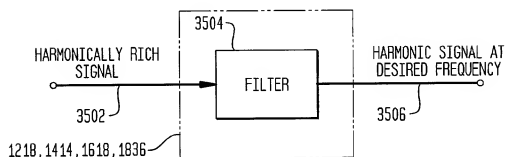
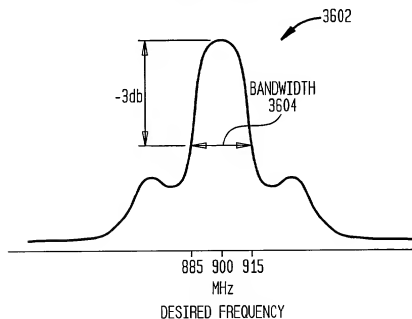


FIG. 36



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30/59

FIG. 37A

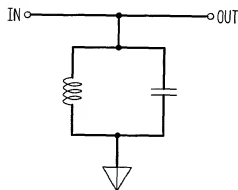


FIG. 37B

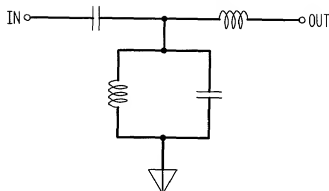
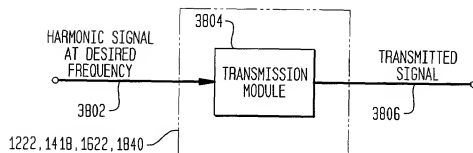


FIG. 38



31/59

FIG. 39A

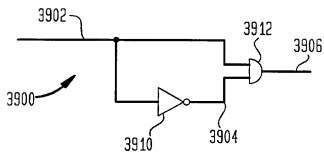


FIG. 39B

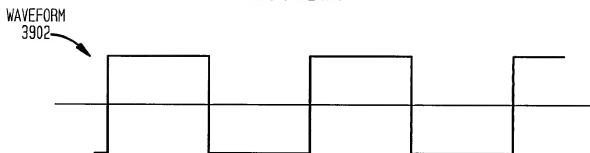


FIG. 39C

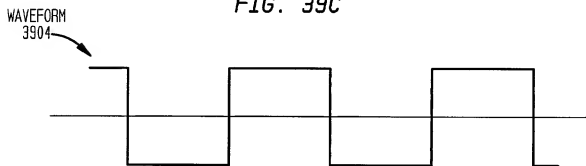
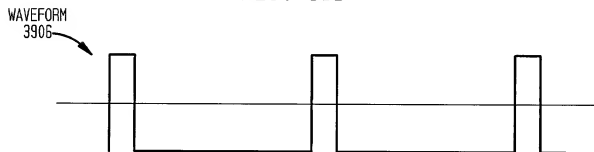


FIG. 39D



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32/59

FIG. 40A

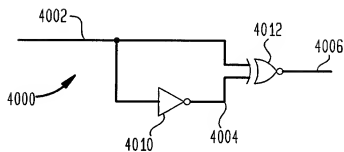


FIG. 40B

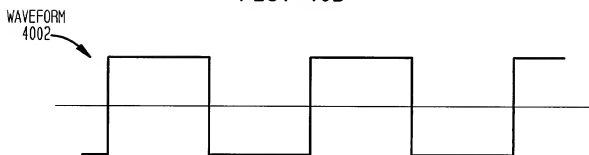


FIG. 40C

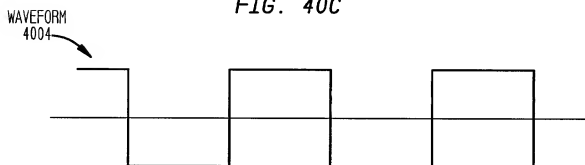
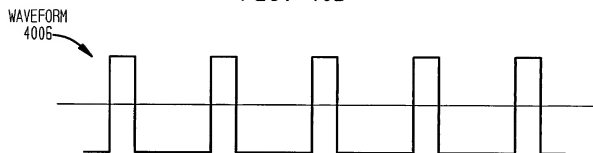


FIG. 40D



2021/07/29 14:00:00

33/59

FIG. 41

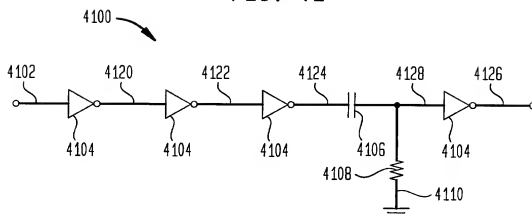


FIG. 42A

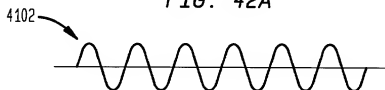


FIG. 42B

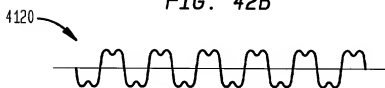


FIG. 42C

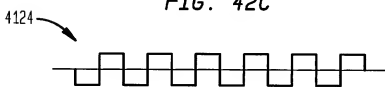


FIG. 42D

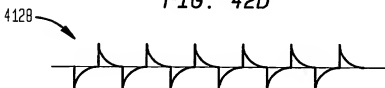
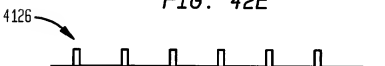


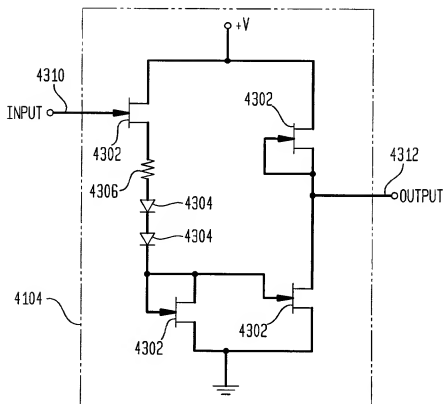
FIG. 42E



2001/02/29 09:00:01

34/59

FIG. 43



2003/07/29 09:00

35/59

INFORMATION
SIGNAL
4402

FIG. 44A



CARRIER
SIGNAL
4404

FIG. 44B



PM SIGNAL
4406

FIG. 44C



HARMONICALLY
RICH SIGNAL
4408

FIG. 44D



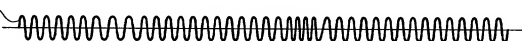
FUNDAMENTAL
HARMONIC
4410

FIG. 44E



SECOND
HARMONIC
4412

FIG. 44F



THIRD
HARMONIC
4414

FIG. 44G



2023-07-29 10:06:36

36/59

FIG. 45A

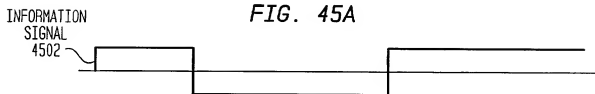


FIG. 45B

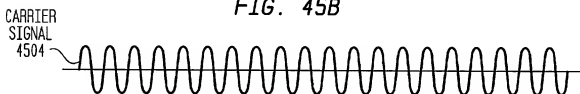


FIG. 45C

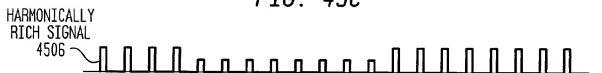


FIG. 45D

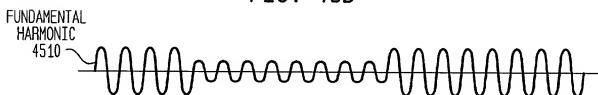


FIG. 45E

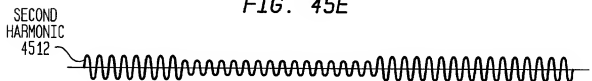
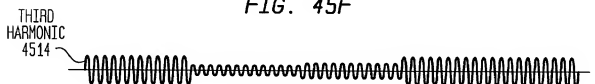


FIG. 45F



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37/59

FIG. 46

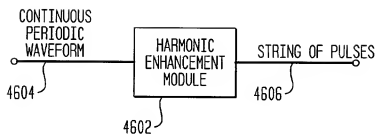
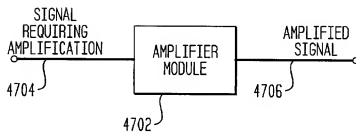


FIG. 47

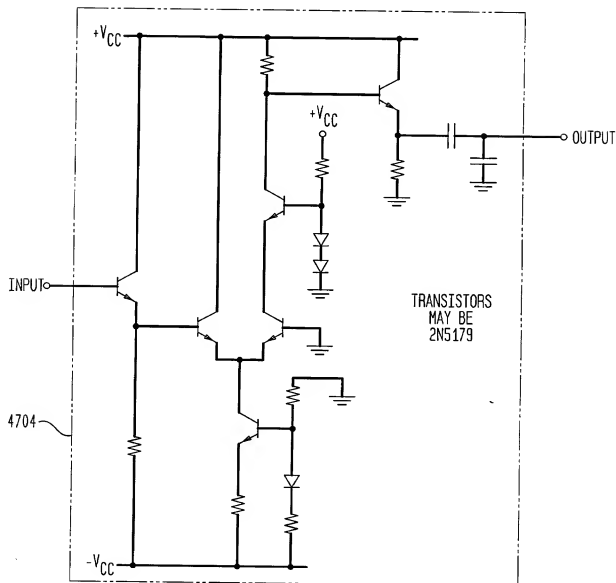


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38/59

FIG. 48A



39/59

FIG. 48B

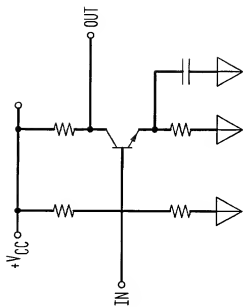


FIG. 49

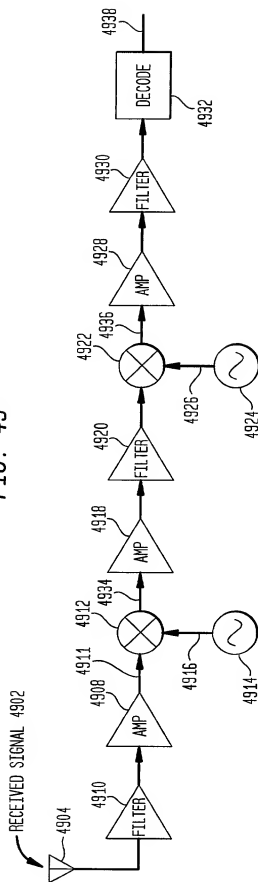
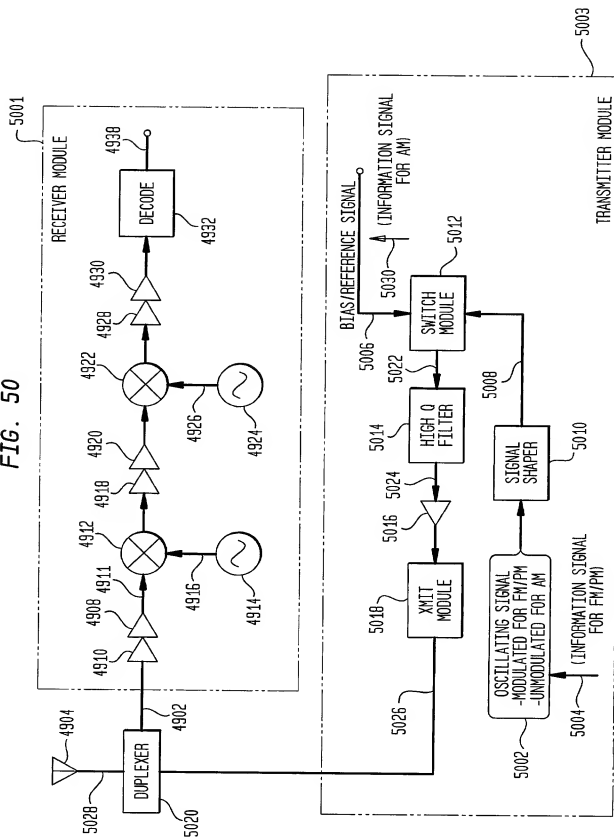
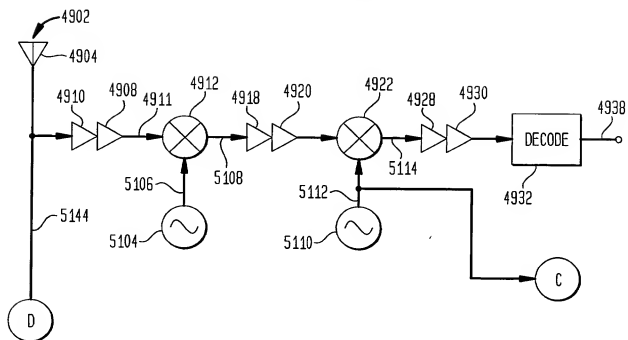


FIG. 50



41/59

FIG. 51A



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42/59

FIG. 51B

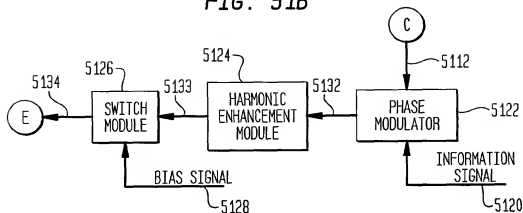


FIG. 51C

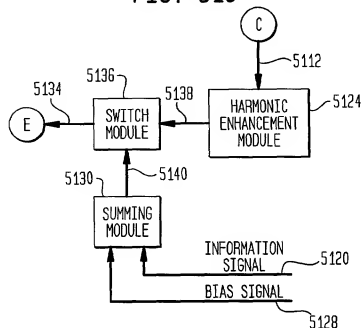
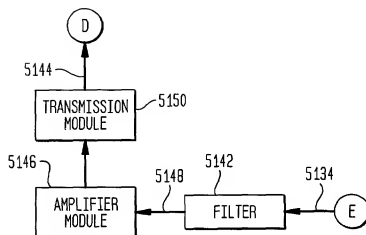


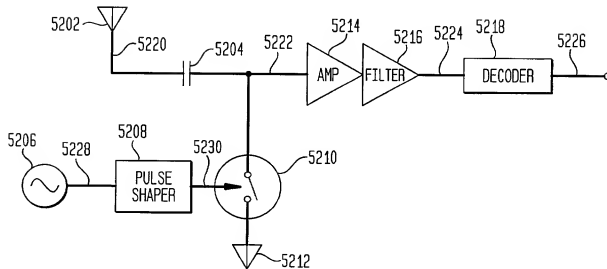
FIG. 51D



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43/59

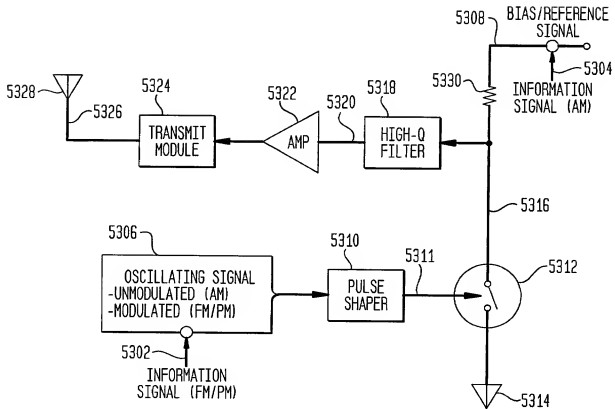
FIG. 52
EXEMPLARY RECEIVER FOR
UNIVERSAL FREQUENCY DOWN-CONVERSION



10086367-071802

44/59

FIG. 53
EXEMPLARY TRANSMITTER USING
THE PRESENT INVENTION

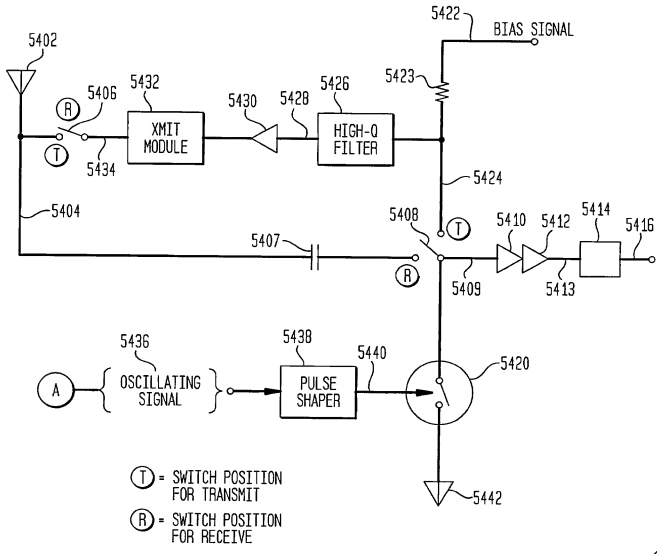


10086367-071802

45/59

FIG. 54A

TRANSMITTER USING PRESENT INVENTION IN A
 HALF DUPLEX COMMUNICATIONS CIRCUIT WITH A
 UNIVERSAL FREQUENCY DOWN-CONVERTER (FM & PM)



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46/59

FIG. 54B

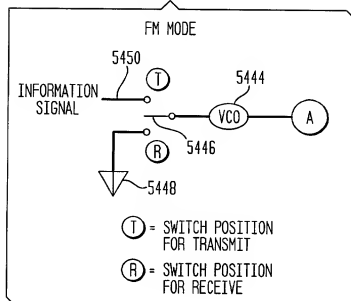
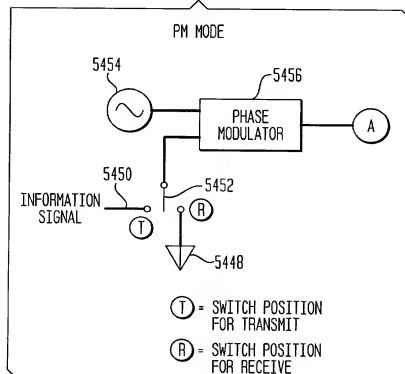


FIG. 54C

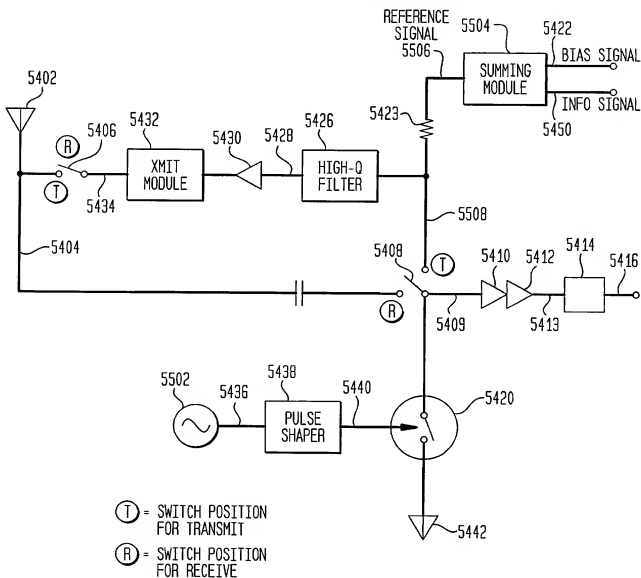


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47/59

FIG. 55

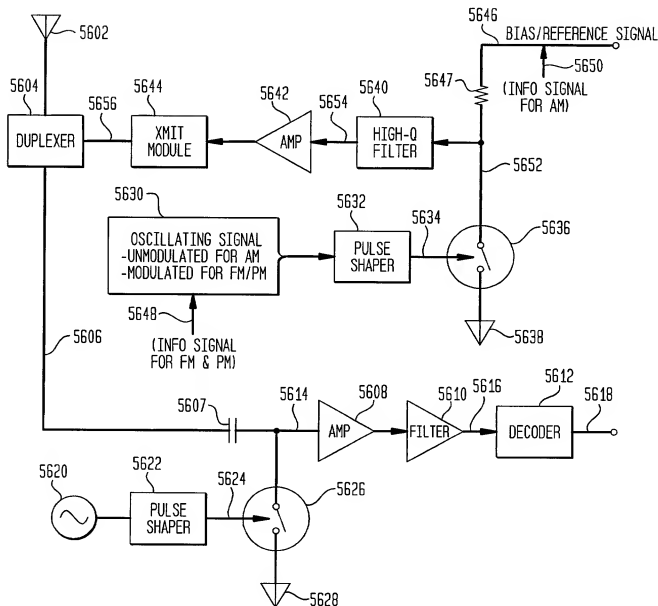
TRANSMITTER USING PRESENT INVENTION IN
A HALF-DUPLEX COMMUNICATIONS CIRCUIT
WITH A UNIVERSAL FREQUENCY DOWN-CONVERTER (AM)



48/59

FIG. 56

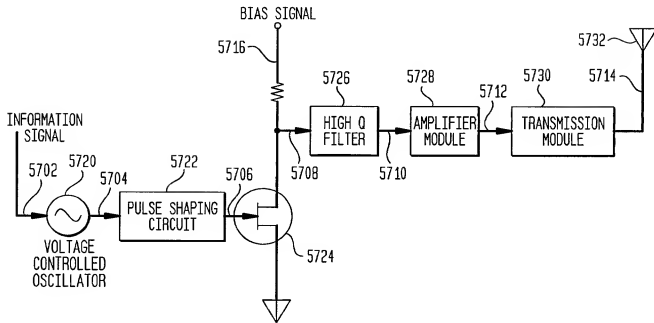
TRANSMITTER USING PRESENT INVENTION IN
 FULL DUPLEX COMMUNICATIONS CIRCUIT WITH
 UNIVERSAL FREQUENCY DOWN-CONVERTER



49/59

FIG. 57A

TRANSMITTER IN THE FM EMBODIMENT



50/59

FIG. 57B

TRANSMITTER IN THE PM EMBODIMENT

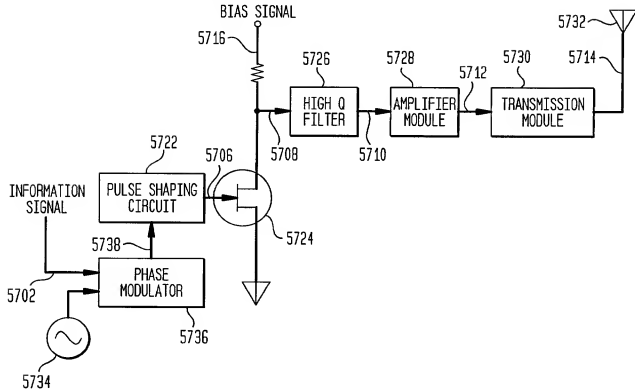
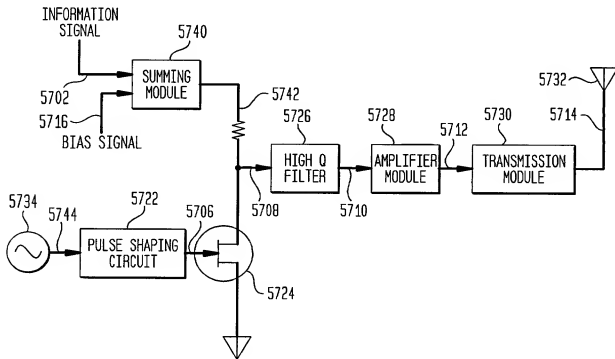


FIG. 57C

TRANSMITTER IN THE AM EMBODIMENT

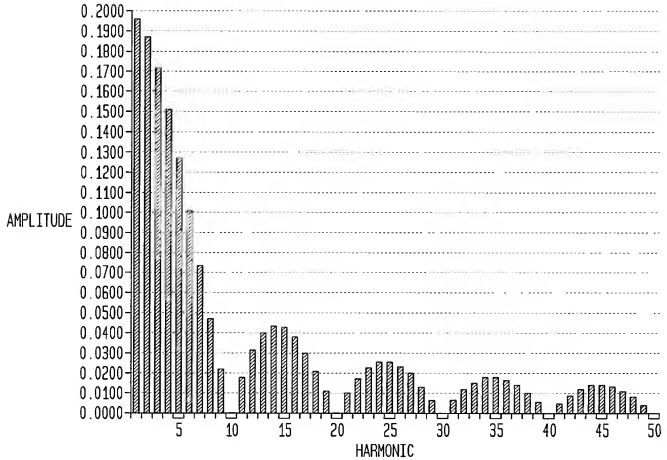


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51/59

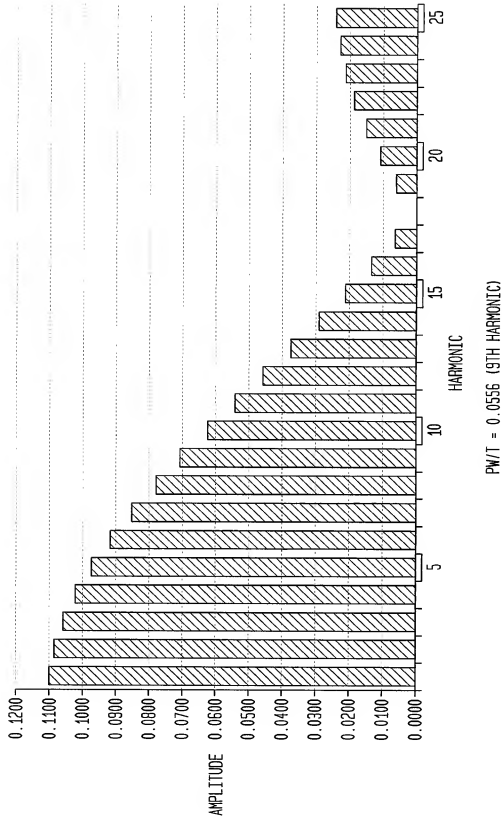
FIG. 5B

PW/T RATIO = 0.1



52/59

FIG. 59



53/59
 FIG. 60

6000

	τ/T	π	0.500	0.250	0.100	0.050	0.010	0.005
HARMONIC								
1			0.6366	0.4502	0.1967	0.0996	0.0200	0.01000
2			0.00	0.3183	0.1871	0.0984	0.0200	0.01000
3			0.2122	0.1501	0.1717	0.0963	0.0200	0.01000
4			0.00	0.00	0.1514	0.0935	0.0199	0.00999
5			0.1273	0.0900	0.1273	0.0900	0.0199	0.00999
6			0.00	0.1061	0.1009	0.0858	0.0199	0.00999
7			0.0909	0.0643	0.0736	0.0810	0.0198	0.00998
8			0.00	0.00	0.0468	0.0757	0.0198	0.00997
9			0.0707	0.0500	0.0219	0.0699	0.0197	0.00997
10			0.00	0.0637	0.00	0.0637	0.0197	0.00996
11			0.0579	0.0409	0.0179	0.0572	0.0196	0.00995
12			0.00	0.00	0.0312	0.0505	0.0195	0.00994
13			0.0490	0.0346	0.0396	0.0436	0.0194	0.00993
14			0.00	0.0455	0.0432	0.0368	0.0194	0.00992
15			0.0424	0.0300	0.0424	0.0300	0.0193	0.00991
16			0.00	0.00	0.0378	0.0234	0.0192	0.00990
17			0.0374	0.0265	0.0303	0.0170	0.0191	0.00988
18			0.00	0.0354	0.0208	0.0109	0.0190	0.00987
19			0.0335	0.0237	0.0104	0.0052	0.0188	0.00985
20			0.00	0.00	0.00	0.00	0.0187	0.00984
21			0.0303	0.0214	0.0094	0.0047	0.0186	0.00982
22			0.00	0.0289	0.0170	0.0089	0.0184	0.00980
23			0.0277	0.0196	0.0224	0.0126	0.0183	0.00978
24			0.00	0.00	0.0252	0.0156	0.0182	0.00976
25			0.0255	0.0180	0.0255	0.0180	0.0180	0.00974
26			0.00	0.0245	0.0233	0.0158	0.0178	0.00972
27			0.0236	0.0167	0.0191	0.0210	0.0177	0.00970
28			0.00	0.00	0.0134	0.0216	0.0175	0.00968
29			0.0220	0.0155	0.0069	0.0217	0.0173	0.00966
30			0.00	0.0212	0.00	0.0212	0.0172	0.00963
31			0.0205	0.0145	0.0063	0.0203	0.0170	0.00961
32			0.00	0.00	0.0117	0.0189	0.0168	0.00958
33			0.0193	0.0136	0.0156	0.0172	0.0166	0.00956
34			0.00	0.0187	0.0178	0.0151	0.0164	0.00953
35			0.0182	0.0129	0.0182	0.0129	0.0162	0.00950
36			0.00	0.00	0.0168	0.0104	0.0160	0.00948
37			0.0172	0.0122	0.0139	0.0078	0.0158	0.00945
38			0.00	0.0169	0.0098	0.0052	0.0156	0.00942
39			0.0163	0.0115	0.0050	0.0026	0.0154	0.00939
40			0.00	0.00	0.00	0.00	0.0151	0.00935
41			0.0155	0.0110	0.0048	0.0024	0.0149	0.00932
42			0.00	0.0152	0.0089	0.0047	0.0147	0.00929
43			0.0148	0.0105	0.0120	0.0067	0.0144	0.00926
44			0.00	0.00	0.0138	0.0085	0.0142	0.00922
45			0.0141	0.0100	0.0141	0.0100	0.0140	0.00919
46			0.00	0.0138	0.0132	0.0112	0.0137	0.00915
47			0.0135	0.0096	0.0110	0.0121	0.0135	0.00912
48			0.00	0.00	0.0078	0.0126	0.0132	0.00908
49			0.0130	0.0092	0.0040	0.0128	0.0130	0.00904
50			0.00	0.0127	0.00	0.0127	0.0127	0.00900

10086367-071802

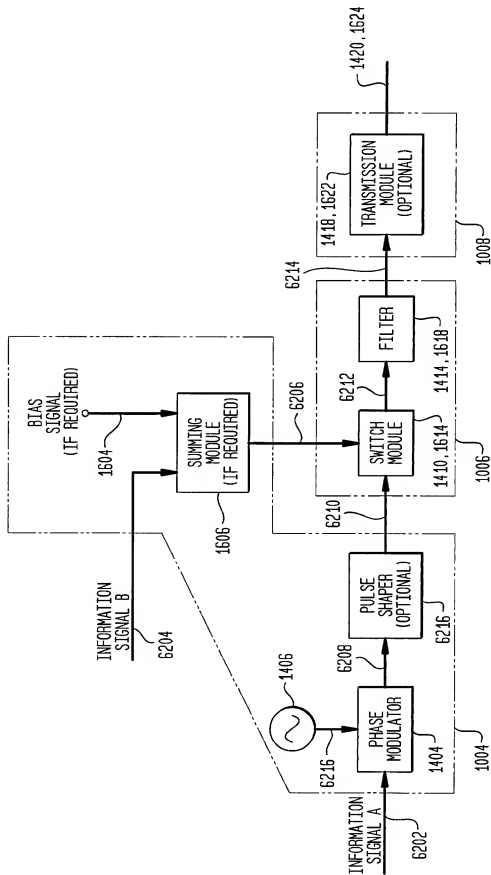
FIG. 61

6100

HARMONIC	τ/T	=	0.5000	2	0.2500	0.1667	0.1250	0.1000	0.0833	0.0714	0.0625	0.0556	0.0500
1			0.6366	0.4502	0.3183	0.2436	0.1967	0.1648	0.1417	0.1242	0.1105	9	10
2			0.0000	0.3183	0.2757	0.2251	0.1871	0.1592	0.1381	0.1218	0.1089	0.0994	
3			0.2122	0.1501	0.1122	0.0861	0.0717	0.0501	0.0323	0.0179	0.0061	0.0063	
4			0.0000	0.0000	0.1378	0.1592	0.1514	0.1378	0.1244	0.1125	0.1023	0.0935	
5			0.1273	0.0900	0.0637	0.1176	0.1273	0.1230	0.1147	0.1059	0.0975	0.0900	
6			0.0000	0.1061	0.0000	0.0750	0.1009	0.1061	0.1034	0.0980	0.0919	0.0858	
7			0.0909	0.0643	0.0465	0.0348	0.0736	0.0878	0.0909	0.0892	0.0855	0.0810	
8			0.0000	0.0000	0.0689	0.0000	0.0488	0.0689	0.0776	0.0796	0.0784	0.0757	
9			0.0707	0.0500	0.0707	0.0271	0.0219	0.0500	0.0637	0.0694	0.0707	0.0699	
10			0.0000	0.0637	0.0551	0.0450	0.0000	0.0318	0.0498	0.0588	0.0627	0.0637	
11			0.0579	0.0409	0.0289	0.0535	0.0179	0.0150	0.0361	0.0481	0.0544	0.0572	
12			0.0000	0.0000	0.0000	0.0531	0.0312	0.0000	0.0230	0.0375	0.0459	0.0505	
13			0.0490	0.0346	0.0245	0.0452	0.0396	0.0227	0.0109	0.0272	0.0375	0.0436	
14			0.0000	0.0455	0.0394	0.0322	0.0432	0.0424	0.0300	0.0094	0.0083	0.0212	0.0300
15			0.0424	0.0300	0.0424	0.0162	0.0162	0.0345	0.0345	0.0173	0.0000	0.0136	0.0234
16			0.0000	0.0000	0.0345	0.0000	0.0143	0.0303	0.0362	0.0233	0.0073	0.0065	0.0170
17			0.0374	0.0265	0.0187	0.0187	0.0250	0.0268	0.0354	0.0277	0.0135	0.0000	0.0109
18			0.0000	0.0354	0.0000	0.0000	0.0276	0.0318	0.0276	0.0310	0.0225	0.0109	0.0000
19			0.0335	0.0237	0.0168	0.0310	0.0104	0.0324	0.0302	0.0186	0.0058	0.0052	
20			0.0000	0.0000	0.0276	0.0318	0.0000	0.0214	0.0214	0.0303	0.0252	0.0152	0.0047
21			0.0303	0.0214	0.0303	0.0290	0.0094	0.0145	0.0282	0.0267	0.0186	0.0089	
22			0.0000	0.0289	0.0251	0.0205	0.0170	0.0472	0.0472	0.0249	0.0211	0.0212	0.0125
23			0.0277	0.0196	0.0138	0.0106	0.0000	0.0252	0.0000	0.0207	0.0265	0.0230	0.0156
24			0.0000	0.0000	0.0000	0.0000	0.0000	0.0252	0.0000	0.0207	0.0265	0.0230	0.0156
25			0.0255	0.0180	0.0127	0.0097	0.0097	0.0255	0.0066	0.0159	0.0250	0.0239	0.0180

55/59

FIG. 62



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56/59

FIG. 63A

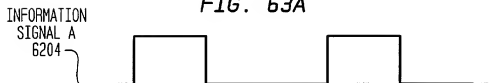


FIG. 63B

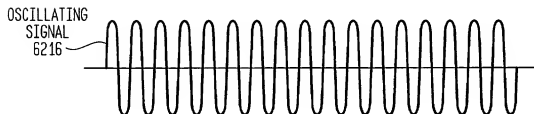


FIG. 63C

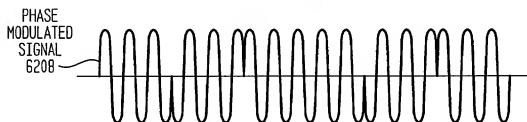


FIG. 63D



10086367-071802

57/59

FIG. 63E

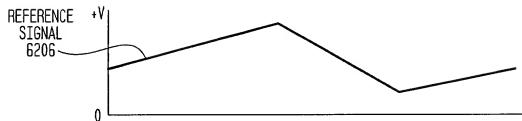


FIG. 63F



FIG. 63G

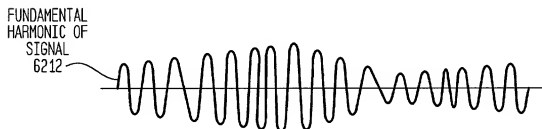


FIG. 63H

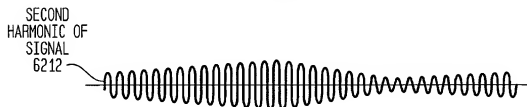


FIG. 63E

58/59

FIG. 64A

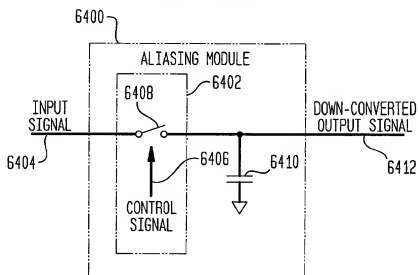
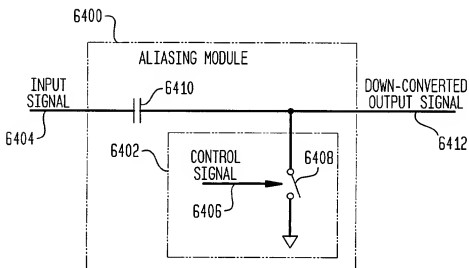


FIG. 64A-1



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59/59

FIG. 64B

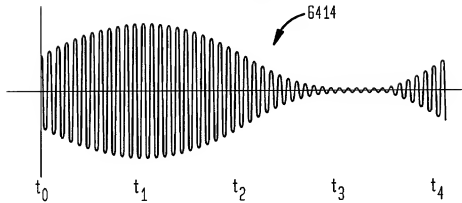


FIG. 64C

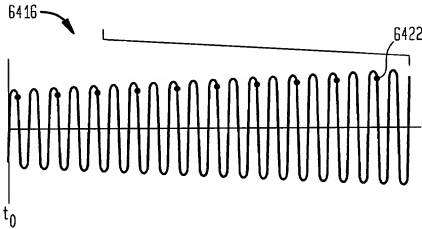


FIG. 64D

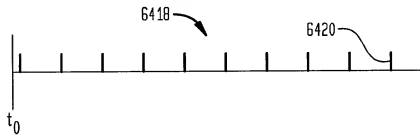


FIG. 64E

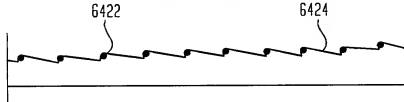
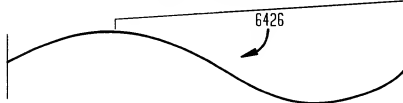


FIG. 64F



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